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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/864,208	05/25/2001	Norio Kimura	2001_0660A	1632

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EXAMINER	
LUND, JEFFRIE ROBERT	
ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 10/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/864,208	KIMURA ET AL.	
	Examiner	Art Unit	
	Jeffrie R. Lund	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-16,18,20,23,25,27 and 38-40* is/are pending in the application.

4a) Of the above claim(s) *14 and 15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16,18,20,23,25,27 and 38-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 16, 23, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laursen et al, US Patent 6,555,466, in view of Lehman et al, US Patent 6,621,264 B1, and Tsai et al, US Patent 6,117,780.

Laursen et al teaches a method of chemical mechanical planarization (polishing) of a first metal layer 2 and a second metal layer 4 that includes the steps of: polishing the first metal layer by pressing and moving the first metal layer against a polishing surface with a first polishing fluid; detecting the end point; rinsing (cleaning) the polishing surface using water; polishing the second metal layer by pressing and moving the second metal layer against the polishing surface with a second polishing fluid; and measuring the second metal layer until it reaches a second end point. (Entire document, specifically, column 3 line 65 through column 4 line 17)

Laursen et al differs from the present invention in that Laursen et al does not teach that an optical film thickness monitor measures the thickness of the second metal layer during the second polishing step, cleaning and drying the wafer, or detecting the films thickness to store or determine if the wafer is transferred to the next process.

Lehman et al teaches that an eddy current monitor works well with thick films (i.e.

the first film) and the optical film thickness monitor works better with thin films (column 13 lines 7-43), and that the thickness measurement can be stored for future reference.

Tsai et al teaches a process that includes the steps of: polishing the wafer 220, cleaning and drying the substrate 260, measuring the films thickness 270, and determining if the wafer is transferred to the next process 280, 281. (Figure 1)

The motivation for measuring the first end point with an eddy current monitor and the second end point with an optical film thickness monitor is to use the most accurate measurement system as taught by Lehman et al in measuring the end points as required by Laursen et al but only generically described.

The motivation for motivation for cleaning and drying the wafer after processing is to remove the slurry and other polishing by-products to prevent damage to the wafer and to prepare the wafer for the next processing step as taught by Tsai et al.

The motivation for measuring the films thickness is to determine the films thickness, and to determine if the polishing step is complete.

The motivation for storing the thickness data is to have the information on the specific wafer and to create a database to help control the processing method as taught by Lehman et al.

The motivation for determining if the polishing step is done is to determine if the safer should be returned for further polishing or passed on to the next process as taught by Tsai et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to measure the end points of Laursen et al with the eddy

current monitor and optical film thickness monitor of Lehman et al; clean and dry the substrate, and measure the thickness of the film as taught by Tsai et al; and store the thickness data as taught by Lehman et al, or determine if the substrate should be passed to the next process as taught by Tsai et al.

3. Claims 18, 20, 25, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laursen et al, Lehman et al, and Tsai et al as applied to claims 16, 23, and 38-40 above, and further in view of Hara et al, 6,451,696 B1.

Laursen et al, Lehman et al, and Tsai et al differ from the present invention in that they do not teach that the second metal layer of the substrate is pressed against the polishing surface by a load which is smaller than the load when polishing the first metal laver, the first and second polishing liquids have a PH at the same side of PH 7.

Hara et al teaches a polishing method that includes a first etching step having a load of 200 gf/cm^2 and a PH of 10.5, and a second etching step having a load of 100 gf/cm^2 and a PH of 10.5. (Column 12 lines 14-37)

The motivation for reducing the load and maintaining the PH of the slurry on the same side of PH 7 is to optimize the speed and quality of the polishing process as taught by Hara et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the load and maintain the PH of the slurry in the method of Laursen et al, Lehman et al, and Tsai et al as taught by Hara et al.

Response to Arguments

4. Applicant's arguments with respect to claims 16, 18, 20, 23, 25, 27, and 38-40

have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art teaches the technological background of the invention.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
10/3/05